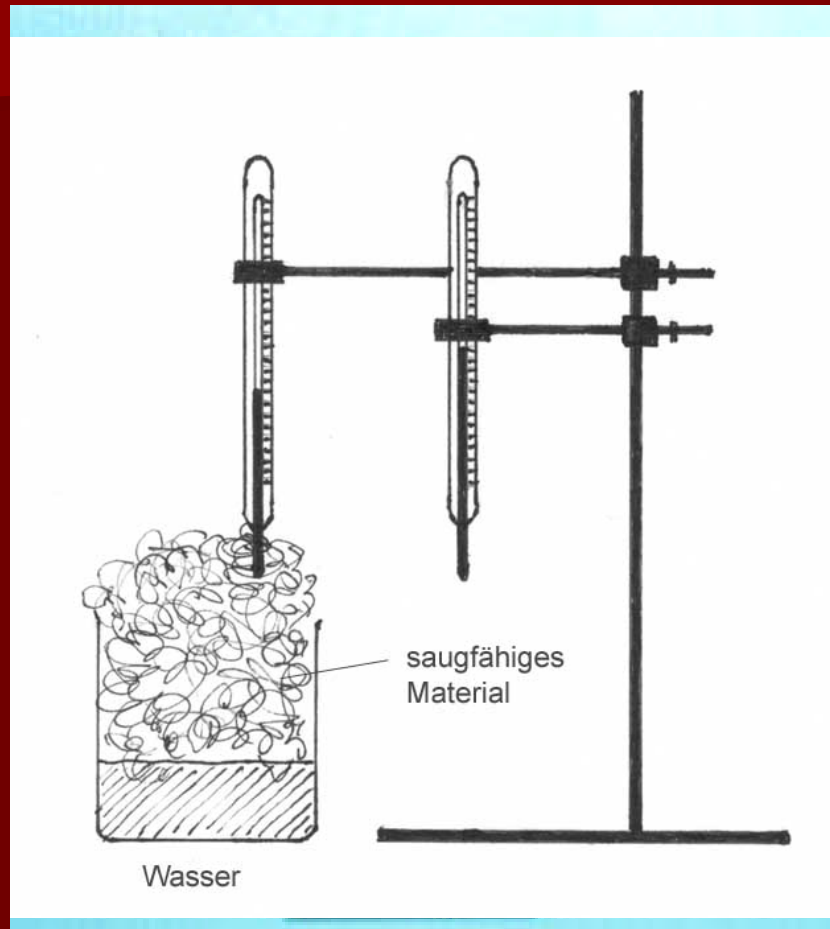


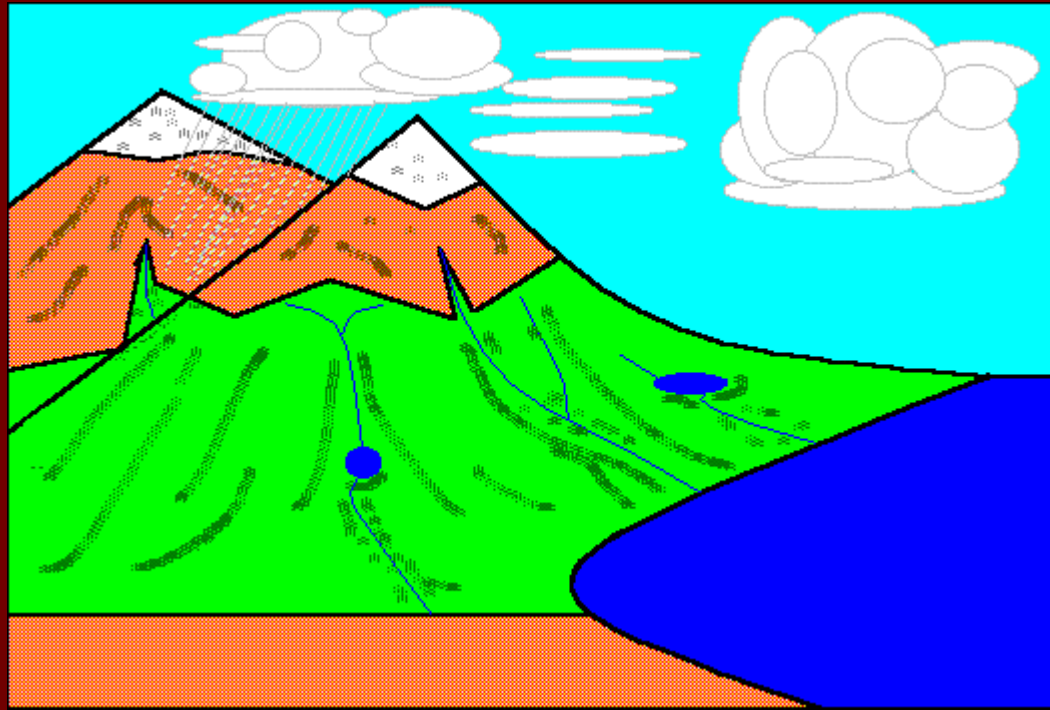
# Function of a Hygrometer

# Pyschrometer or Hygrometer



# Evaporation

- the conversion of water from a liquid into a gas



# Condensation

- Condensation is the process by which water vapor becomes a liquid.



# Precipitation

- Any of all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground.
- rain
- drizzle
- snow
- hail



# Humidity

- Dampness, especially of the air.
  - Moisture
    - Moisture in the air

**If the air is at 100-percent relative humidity, sweat will not evaporate into the air. As a result, we feel much hotter than the actual temperature when the relative humidity is high.**



# Relative humidity

- is a term used to describe the amount of water vapor that exists in a gaseous mixture of air and water.

- Humans are very sensitive to humidity, as the skin relies on the air to get rid of moisture. The process of sweating is your body's attempt to keep cool and maintain its current temperature.





- If the air is at 100% relative humidity, sweat will not evaporate into the air. As a result, we feel much hotter than the actual temperature. If the relative humidity is high. If the relative humidity is low, we can feel cooler than the actual temperature. evaporation.



# example

if the air temperature is 24 degrees Celsius and the relative humidity is zero percent, the air temperature feels like 21 C to our bodies. If the air temperature is 24 C and the relative humidity is 100 percent, we feel like it's 27 C out.

- People tend to feel most comfortable at a relative humidity of about 45 percent.
- Humidifiers and dehumidifiers help to keep indoor humidity at a comfortable level.

## Dew point.

- The temperature at which air becomes saturated when cooled without addition of moisture or change of pressure. Any further cooling causes condensation; fog and dew are formed in this way.

## Dew point temperature.

is defined as the temperature to which the air would have to cool (at constant pressure and constant water vapour content) in order to reach saturation.

Air temp. (F)	Depression of the wet-bulb thermometer														
		1	2	3	4	6	8	10	12	14	16	18	20	25	30
0	-7	-20													
5	-1	-9	-24												
10	5	-2	-10	-27											
15	11	6	0	-9											
20	16	12	8	2	-21										
25	22	19	15	10	-3	-15									
30	27	25	21	18	8	-7									
35	33	30	28	25	17	7	-11								
40	38	35	33	30	25	18	7	-14							
45	43	41	38	36	31	25	18	7	-14						
50	48	46	44	42	37	32	26	18	8	-13					
55	53	51	50	48	43	38	33	27	20	9	-12				
60	58	57	55	53	49	45	40	35	29	21	11	-8			
65	63	62	60	59	55	51	47	42	37	31	24	14			
70	69	67	65	64	61	57	53	49	44	39	33	26	-11		
75	74	72	71	69	66	63	59	55	51	47	42	36	15		
80	79	77	76	74	72	68	65	62	58	54	50	44	28	-7	
85	84	82	81	80	77	74	71	68	64	61	57	52	39	19	
90	89	87	86	85	82	79	76	73	70	67	63	59	48	32	
95	94	93	91	90	87	85	82	79	76	73	70	66	56	43	
100	99	98	96	95	93	90	87	85	82	79	76	72	63	52	

# Dew Point Table

Example

Dry = 15°F

Wet = 14°F

15°F - 14°F = 1 dep of wet bulb

Dew point temp = 6°F

Air temp. (F)	Depression of the wet-bulb thermometer													
	1	2	3	4	6	8	10	12	14	16	18	20	25	30
0	67	33	1											
5	73	46	20											
10	78	56	34	13										
15	82	64	46	29										
20	85	70	55	40	12									
25	87	74	62	49	25	1								
30	89	78	67	56	36	16								
35	91	81	72	63	45	27	10							
40	92	83	75	68	52	37	22	7						
45	93	86	78	71	57	44	31	18	6					
50	93	87	80	74	61	49	38	27	16	5				
55	94	88	82	76	65	54	43	33	23	14	5			
60	94	89	83	78	68	58	48	39	30	21	13	5		
65	95	90	85	80	70	61	52	44	35	27	20	12		
70	95	90	86	81	72	64	55	48	40	33	25	19	3	
75	96	91	86	82	74	66	58	51	44	37	30	24	9	
80	96	91	87	83	75	68	61	54	47	41	35	29	15	3
85	96	92	88	84	76	70	63	56	50	44	38	32	20	8
90	96	92	89	85	78	71	65	58	52	47	41	36	24	13
95	96	93	89	86	79	72	66	60	54	49	44	38	27	17
100	96	93	89	86	80	73	68	62	56	51	46	41	30	21

# Rel. Humidity Table

Example

Dry = 15°F

Wet = 14°F

15°F - 14°F = 1 dep of wet bulb

Rel Hum = 82 %

- Condensation of water vapour begins when the temperature of air is lowered to its dew point and beyond. The dew point, like other measures of humidity, can be calculated from readings taken by a hygrometer.

**Dew  
Point  
Temp. °C**

**Human Perception**

**Relative  
Humidity  
Air Temp 90°F**

>24°C

Extremely uncomfortable, oppressive

62%

21 - 24°C

Very Humid, quite uncomfortable

52% - 60%

18 - 21°C

Somewhat uncomfortable for most people  
at upper limit

44% - 52%

16 - 18°C

OK for most, but everyone perceives the  
humidity  
at upper limit

37% - 46%

13 - 16°C

Comfortable

31% - 41%

10 - 12°C

Very comfortable

31% - 37



# Review

- Humidity - Dampness, especially of the air.
- Relative humidity - is a term used to describe the amount of water vapor that exists in a gaseous mixture of air and water.
- Dew point - The temperature at which air becomes saturated when cooled without addition of moisture or change of pressure. Any further cooling causes condensation; fog and dew are formed in this way.
- Dew point temperature - is defined as the temperature to which the air would have to cool (at constant pressure and constant water vapour content) in order to reach saturation.

# Application

- Meteorology
- Cargo Handling

# Quiz

- \_\_\_\_\_1. the conversion of water from a liquid into a gas
- \_\_\_\_\_2. Condensation is the process by which water vapor becomes a liquid.
- \_\_\_\_\_3. Any of all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground.

# Quiz

- \_\_\_\_\_ 4. Dampness, especially of the air.
- \_\_\_\_\_ 5. is a term used to describe the amount of water vapor that exists in a gaseous mixture of air and water.
- \_\_\_\_\_ 6. An instrument that uses the difference in readings between two thermometers, one having a wet bulb and the other having a dry bulb, to measure the moisture content or relative humidity of air.
- \_\_\_\_\_ 7. The temperature at which air becomes saturated when cooled without addition of moisture or change of pressure. Any further cooling causes condensation; fog and dew are formed in this way.
- \_\_\_\_\_ 8. \_\_\_\_\_ 9. \_\_\_\_\_ Give an example of precipitation.

# Quiz

- \_\_\_\_\_10. Give an example of a condensation.
- \_\_\_\_\_11. Give an example of evaporation
- \_\_\_\_\_12. and dehumidifiers help to keep indoor humidity at a comfortable level.
- \_\_\_\_\_13. begins when the temperature of air is lowered to its dew point and beyond.

Air temp. (F)	Depression of the wet-bulb thermometer														
		1	2	3	4	6	8	10	12	14	16	18	20	25	30
0	-7	-20													
5	-1	-9	-24												
10	5	-2	-10	-27											
15	11	6	0	-9											
20	16	12	8	2	-21										
25	22	19	15	10	-3	-15									
30	27	25	21	18	8	-7									
35	33	30	28	25	17	7	-11								
40	38	35	33	30	25	18	7	-14							
45	43	41	38	36	31	25	18	7	-14						
50	48	46	44	42	37	32	26	18	8	-13					
55	53	51	50	48	43	38	33	27	20	9	-12				
60	58	57	55	53	49	45	40	35	29	21	11	-8			
65	63	62	60	59	55	51	47	42	37	31	24	14			
70	69	67	65	64	61	57	53	49	44	39	33	26	-11		
75	74	72	71	69	66	63	59	55	51	47	42	36	15		
80	79	77	76	74	72	68	65	62	58	54	50	44	28	-7	
85	84	82	81	80	77	74	71	68	64	61	57	52	39	19	
90	89	87	86	85	82	79	76	73	70	67	63	59	48	32	
95	94	93	91	90	87	85	82	79	76	73	70	66	56	43	
100	99	98	96	95	93	90	87	85	82	79	76	72	63	52	

# Dew Point Table

- 4. Dry= 20°F  
Wet = 18°F
- 5. Dry= 15°F  
Wet = 13°F
- 6. Dry= 35°F  
Wet = 32°F

Air temp. (F)	Depression of the wet-bulb thermometer													
	1	2	3	4	6	8	10	12	14	16	18	20	25	30
0	67	33	1											
5	73	46	20											
10	78	56	34	13										
15	82	64	46	29										
20	85	70	55	40	12									
25	87	74	62	49	25	1								
30	89	78	67	56	36	16								
35	91	81	72	63	45	27	10							
40	92	83	75	68	52	37	22	7						
45	93	86	78	71	57	44	31	18	6					
50	93	87	80	74	61	49	38	27	16	5				
55	94	88	82	76	65	54	43	33	23	14	5			
60	94	89	83	78	68	58	48	39	30	21	13	5		
65	95	90	85	80	70	61	52	44	35	27	20	12		
70	95	90	86	81	72	64	55	48	40	33	25	19	3	
75	96	91	86	82	74	66	58	51	44	37	30	24	9	
80	96	91	87	83	75	68	61	54	47	41	35	29	15	3
85	96	92	88	84	76	70	63	56	50	44	38	32	20	8
90	96	92	89	85	78	71	65	58	52	47	41	36	24	13
95	96	93	89	86	79	72	66	60	54	49	44	38	27	17
100	96	93	89	86	80	73	68	62	56	51	46	41	30	21

# Rel. Humidity Table

- 7. Dry= 20°F  
Wet = 18°F
- 8. Dry= 20°F  
Wet = 22°F
- 9. Dry= 15°F  
Wet = 14°F
- 0. Dry= 45°F  
Wet = 41°F